Notice of Allowability	Application No.	Applicant(s)	
	10/070,846	IRWIN ET AL.	
	Examiner	Art Unit	
	Kamran Afshar, 703-305-7373	2681	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *12/3/2004*.

2. ☒ The allowed claim(s) is/are *1-8 and 27-42*.

3. ☒ The drawings filed on *3/11/2002* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EMMANUEL L. MOISE
PRIMARY EXAMINER

DETAILED ACTION

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Vince B. Ingrassia, Reg. No. 25, 732 on 3/11/2005.

The application / claims have been amended as follows:

AMENDMENTS TO THE CLAIMS

1. (Twice Amended) A communications link for the cellular communications system, comprising:

a first airplane for flying in a first pattern and including a first antenna for transmitting RF beams to form a first footprint on a first target geographic area to provide cellular phone users within the footprint with a first communications link said second footprint at least partially overlapping said first footprint;

a second airplane for flying in a second pattern and including a second antenna for transmitting RF beams to form a second footprint on a second target geographic area to provide cellular phone users within the second footprint with a second communications link;

said first and second airplane configured to fly ~~flying~~ in the first and second patterns ~~each~~ at an altitude ~~below a high altitude level~~ less than approximately fifty thousand (50,000) feet;

said first and second patterns being varied to enable the first and second airplane to provide continuous uninterrupted coverage via first and second beam patterns, respectively, to a service area below in a weather pattern-independent and geographic feature-independent manner.

2. (Original) The communications link of claim 1, further comprising a first airport located away from a center of a coverage area of the first and second airplane corresponding to a glide-down distance of the first and second airplane.

3. (Original) The communications link of claim 2, further comprising a second airport for providing services generally redundant to those at the first airport, the second airport being situated at a location that is accessible to the first and second airplane.

4. (Original) The communication link of claim 3, further comprising a third airplane located at one of the first and second airports for providing coverage redundant to that of the first and second airplanes.

5. (Original) The communications link of claim 1, wherein the first and second airplanes comprise a first airborne coverage group, and further comprising at least one other airborne coverage group for providing services generally redundant to those of the first airborne coverage group.

6. (Amended) The communications link of claim 1, wherein the first and second airplanes fly at the same altitude that is less than approximately fifty thousand (50,000) feet.

7. (Amended) The communications link of claim 1, wherein the first and second airplanes fly at different altitudes that are less than approximately fifty thousand (50,000) feet.

8. (Original) The communications link of claim 1, wherein altitudes of the first and second airplanes vary according to link margin requirements.

Cancel claims 9-26

27. (New) The communications link of claim 1, wherein said first and second airplanes are configured to fly in the first and second patterns at altitudes of approximately thirty thousand (30,000) feet.

28. (New) The communications link of claim 1, wherein at least one of the first and second airplanes is for adjusting the first and second flight patterns, respectively, so that at least one of the first and second beam patterns is capable of circumventing a storm.

29. (New) The communications link of claim 1, wherein the first airplane is for handing off calls to the second airplane when necessary to provide the continuous uninterrupted communications coverage.

30. (New) An airborne link for a cellular communications system, comprising:

a first airplane configured to fly in a first pattern at a first altitude less than approximately fifty thousand (50,000) feet and configured to transmit RF beams to provide communications coverage within a first beam footprint covering a specified geographic area; and

a second airplane configured to replace the first airplane at an end of a mission of the first airplane by establishing a second flight pattern at a second altitude less than approximately fifty thousand (50,000) feet and a second beam footprint that enables call switchover in a manner that minimizes dropped calls, wherein the first and second flight pattems are substantially parallel flight patterns and substantially 180° out-of-phase flight patterns.

31. (New) The airborne link of claim 30, further comprising a ground control station for directing the call switchover when the second airplane establishes a call switchover rendezvous flight pattern at an altitude less than approximately fifty thousand (50,000) feet.

32. (New) The airborne link of claim 31, wherein the ground control station gradually switches over calls within the first beam footprint to the second beam footprint by gradually reducing output power associated with the first beam footprint to cause user handsets to switch to the second beam footprint.

33. (New) The airborne link of claim 30, wherein the first airplane initiates the call switchover by gradually reducing output power associated with the first beam footprint to cause user handsets to switch to the second beam footprint.

34. (New) A method of switching calls over from an original airplane-based communications link in a cellular communications system to a replacement airplane-based communications link, comprising:

maintaining a first airplane in a first flight pattern at an altitude less than approximately fifty thousand feet (50,000) to provide continuous coverage over a designated geographic area through a first communications link;

flying a second airplane up to a predetermined flight pattern having a predetermined altitude less than approximately fifty thousand feet (50,000) to establish a second communications link over the designated geographic area;

moving calls carried on the first communications link to the second communications link according to predetermined switchover protocol; and

flying the first airplane out of the first flight pattern after all of the calls have been switched over to the second communication link.

35. (New) The method of claim 34, wherein the moving of calls is a ground control-based operation.

36. (New) The method of claim 34, wherein the moving of calls is a power control-based operation in which power of the first communications link is gradually reduced to enable calls on the first communications link to be gradually handed off to the second communications link.

37. (New) The method of claim 34, wherein the moving of calls is a split spectral resources-based operation in which a percentage of spectral resources assigned to the second communications link is gradually increased until 100% of all spectral resources are assigned to the second communications link.

38. (New) A method of providing cellular communications coverage using an airplane based antenna array, comprising:

establishing cellular communications coverage over a predetermined geographic area via a first generally circular flight pattern with an outer point thereof being tangential to a circumscribing flight pattern circle having a radius larger than that of the first flight pattern;

if a weather pattern affects the communications coverage, moving from the first flight pattern along the circumscribing flight pattern circle until a new operating point corresponding to a point of an alternate flight pattern that is tangential to the circumscribing flight pattern is reached; and

executing the alternate flight pattern having a radius similar to the first flight pattern to maintain the cellular communication coverage over the predetermined geographic area.

39. (New) The method of claim 38, further comprising adjusting the cellular communications coverage during the moving from the first flight pattern to maintain the cellular communications coverage over the predetermined geographic area.

40. (New) The method of claim 39, wherein the moving from the first flight pattern further comprises at least one of turning beams providing the cellular communications coverage on/off and re-shaping the beams providing the cellular communications coverage.

41. (New) The method of claim 38, wherein the moving from the first flight pattern is an airplane-based function.

42. (New) The method of claim 38, wherein the moving from the first flight pattern is a terrestrial-based function.

Allowable Subject Matter

2. Claims 1-8 and 27-42 are allowed.

The following is an examiner's statement of reasons for allowance: 1-8 and 27-42.

With respect to amended claim 1, the prior art of record fails to disclose or render obvious that the first and second airplane configured to fly in the first and second patterns at an altitude less than approximately fifty thousand (50,000) feet; the first and second patterns being varied to enable the first and second airplane to provide continuous uninterrupted coverage via first and second beam patterns, respectively, to a service area below in a weather pattern-independent and geographic feature-independent manner.

With respect to claim 30, the prior art of record fails to disclose or render obvious that a second airplane configured to replace the first airplane at an end of a mission of the first airplane by establishing a second flight pattern at a second altitude less than approximately fifty thousand (50,000) feet and a second beam footprint that enables call switchover in a manner that minimizes dropped calls, wherein the

first and second flight patterns are substantially parallel flight patterns and substantially 180° out-of-phase flight patterns.

With respect to claim 34, the prior art of record fails to disclose or render obvious that flying a second airplane up to a predetermined flight pattern having a predetermined altitude less than approximately fifty thousand feet (50,000) to establish a second communications link over the designated geographic area; moving calls carried on the first communications link to the second communications link according to predetermined switchover protocol; and flying the first airplane out of the first flight pattern after all of the calls have been switched over to the second communication link.

With respect to claim 38, the prior art of record fails to disclose or render obvious that if a weather pattern affects the communications coverage, moving from the first flight pattern along the circumscribing flight pattern circle until a new operating point corresponding to a point of an alternate flight pattern that is tangential to the circumscribing flight pattern is reached; and executing the alternate flight pattern having a radius similar to the first flight pattern to maintain the cellular communication coverage over the predetermined geographic area.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Kamran Afshar whose telephone number is (703) 305-7373. The examiner can be reached on Monday-Friday.

If attempts to reach the examiner by the telephone are unsuccessful, the examiner's supervisor, Emmanuel Moise can be reached @ (703) 306-0003. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all communications.

Kamran Afshar

EMMANUEL L. MOISE
PRIMARY EXAMINER